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Kamor

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(54) **ACTUATOR BIASED BY A HORIZONTAL MEMBER**

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(51) **Int. Cl.**

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H01H 19/00	(2006.01)
H01H 19/14	(2006.01)
H01H 21/00	(2006.01)
H01H 23/14	(2006.01)
H01H 3/50	(2006.01)
H01H 23/20	(2006.01)

(52) **U.S. Cl.**

CPC ***H01H 23/145*** (2013.01); ***H01H 3/50*** (2013.01); *H01H 23/20* (2013.01)

(58) **Field of Classification Search**

CPC H01H 3/00; H01H 3/02; H01H 3/08; H01H 19/00; H01H 19/14; H01H 21/00; H01H 21/04; H01H 21/36; H01H 23/00; H01H 23/16; H01H 23/24; H01H 2221/016; H01H 2233/03; H01H 2300/01; H01H 3/04; H01H 2003/00; H01H 2003/02; H01H 2021/00; H01H 2221/00; H01H 2221/018; H01H 23/20; H01H 21/24; H01H 21/02; H01H 19/635; H02G 3/14

USPC ..... 200/336, 297, 293, 5 E, 56 R, 61.02, 200/308, 310, 312–314, 317, 302.1, 333

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,207,317	A	5/1993	Bryde et al.	
5,950,812	A	9/1999	Tanacan et al.	
6,005,308	A *	12/1999	Bryde	H05B 39/00 200/335
6,875,940	B2	4/2005	Endres et al.	
7,170,018	B2	1/2007	Ilkhanov	
7,416,310	B1 *	8/2008	Savicki, Jr.	H01H 3/0213 200/317
8,003,904	B2	8/2011	Wu	
2011/0259722	A1	10/2011	Alderson et al.	

* cited by examiner

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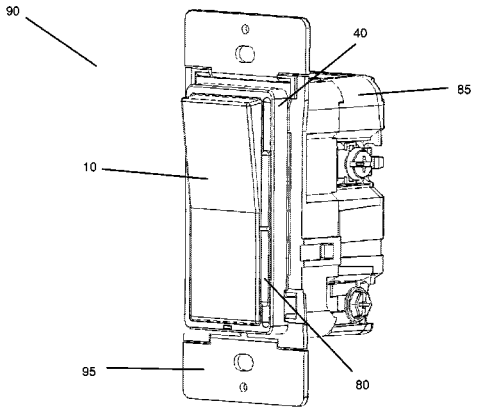
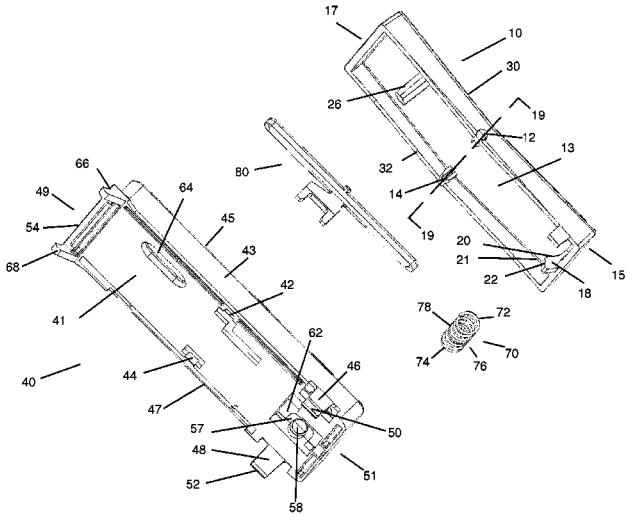
(57) **ABSTRACT**

An exemplary embodiment of an electrical device is disclosed. The electrical wiring device preferably includes a frame, a rocker, and a resilient member. In use, the rocker pivotally rotates through a range of travel, for example, from a first position to a second position. As the rocker moves, the resilient member imparts a force on the rocker, biasing the rocker in the first position and the second position. In a particularly preferred embodiment, the resilient member extends horizontally across the electrical wiring device (e.g., along a minor axis of the rocker).

27 Claims, 15 Drawing Sheets





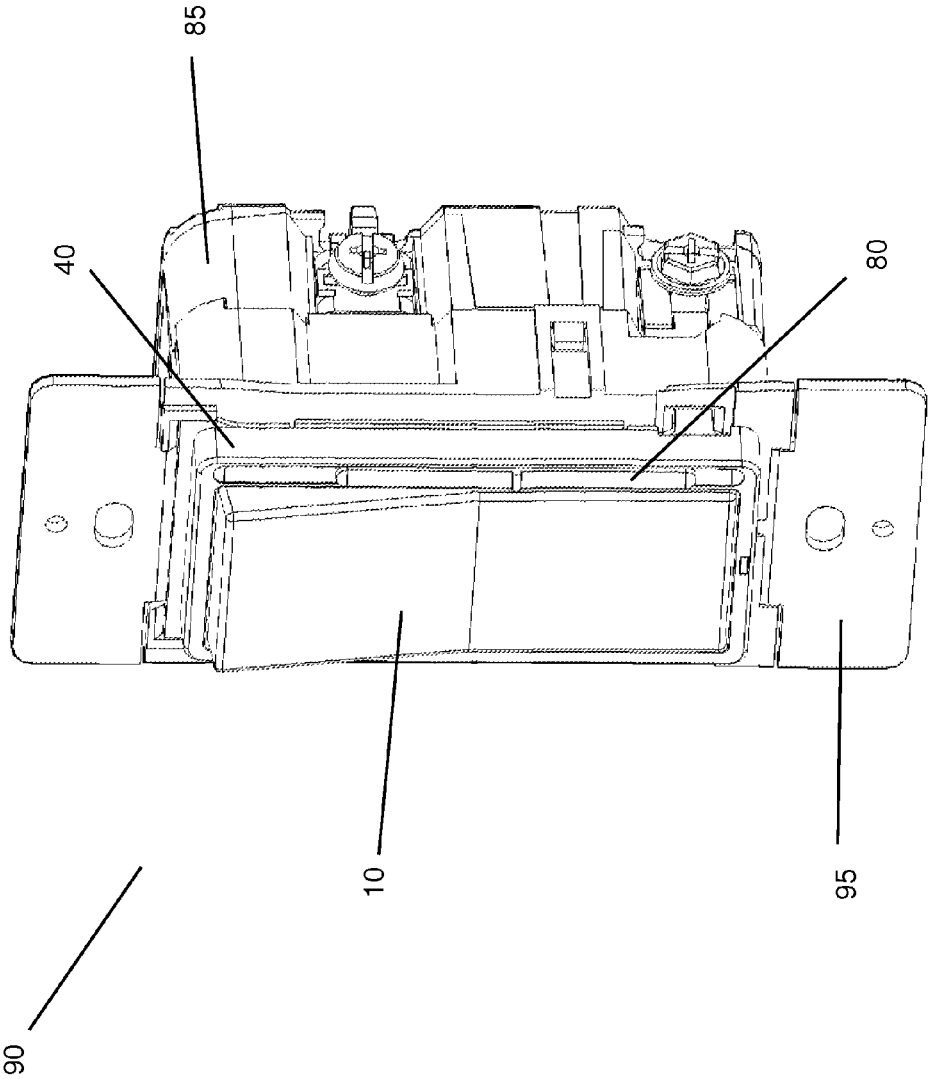


FIG. 1

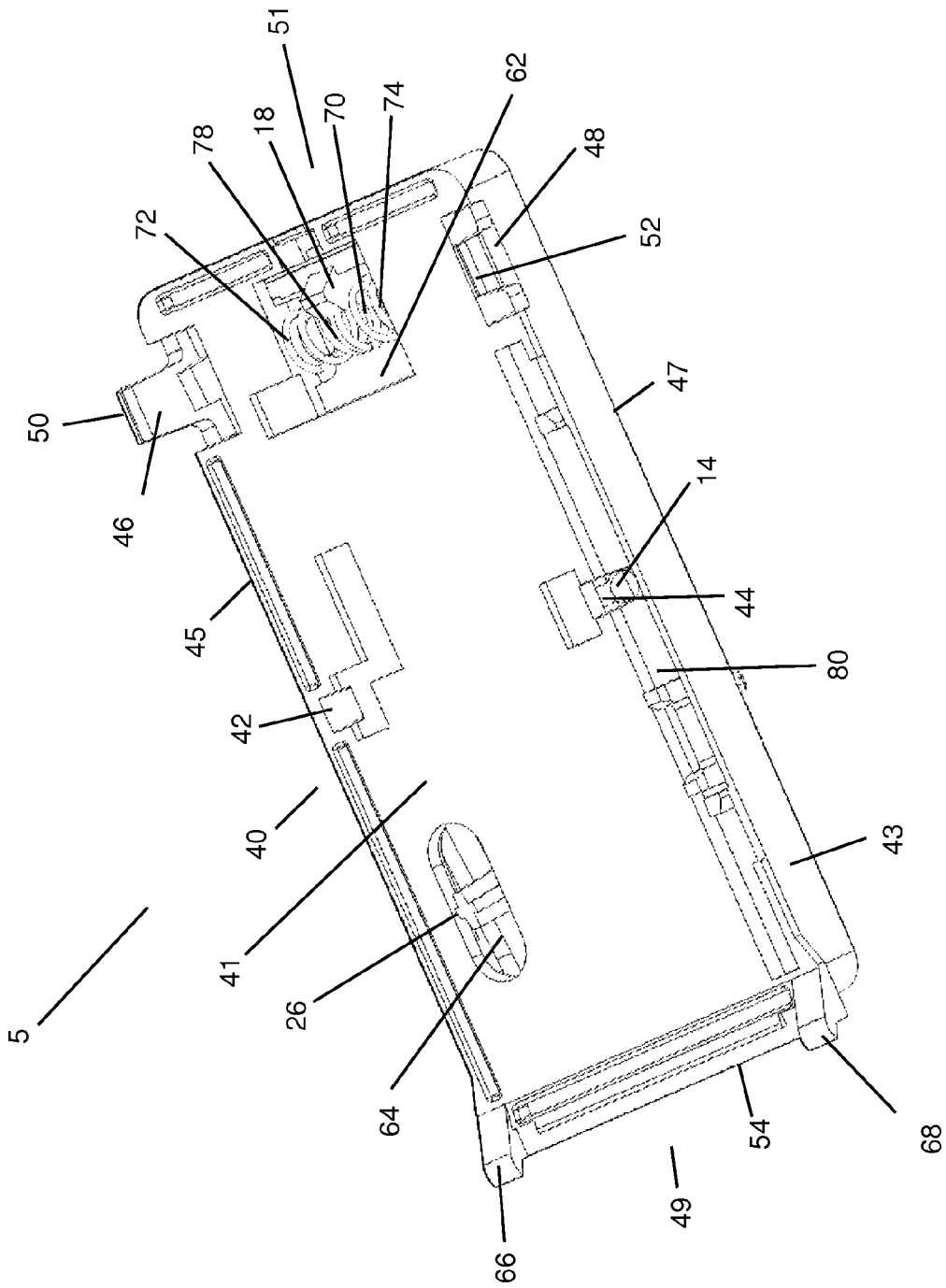

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FIG. 2A

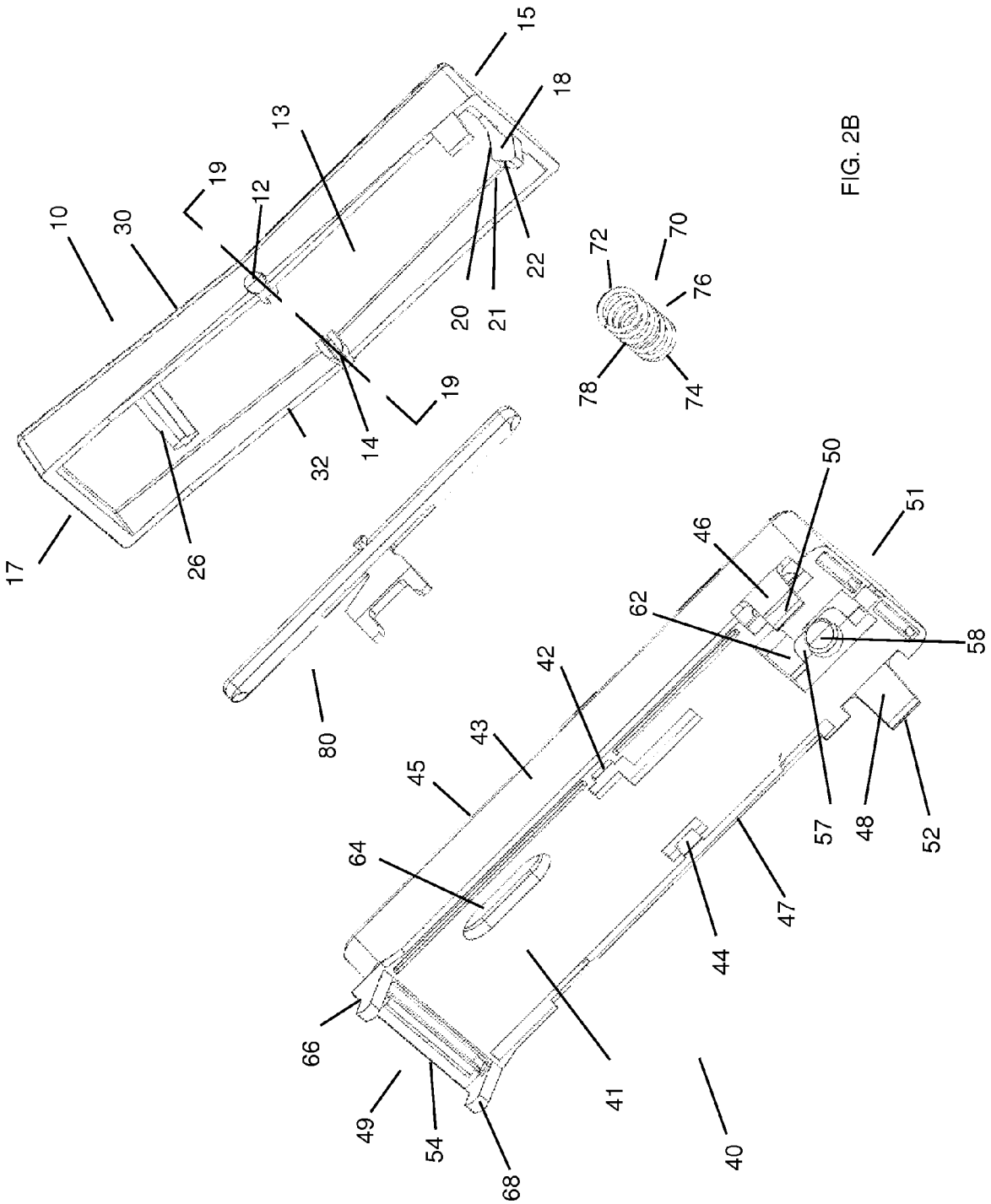
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FIG. 2B

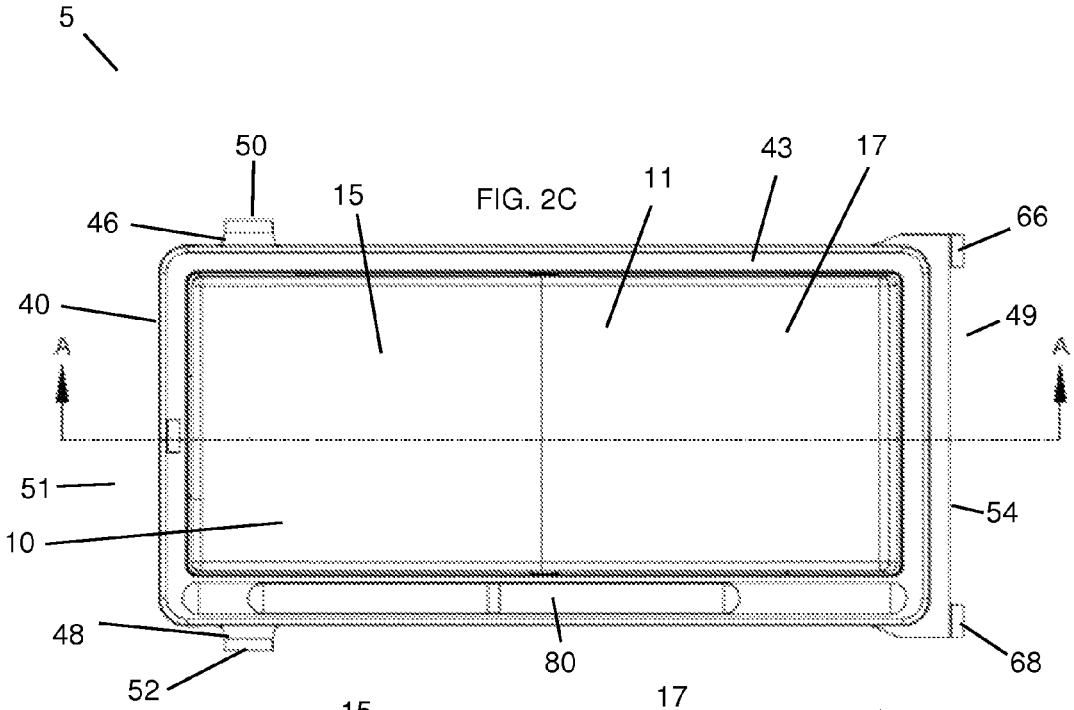
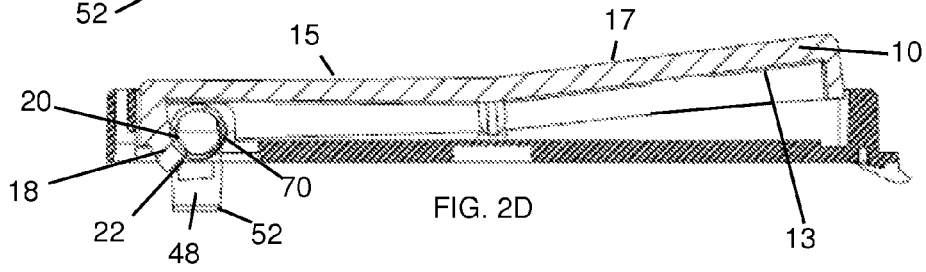


FIG. 2C



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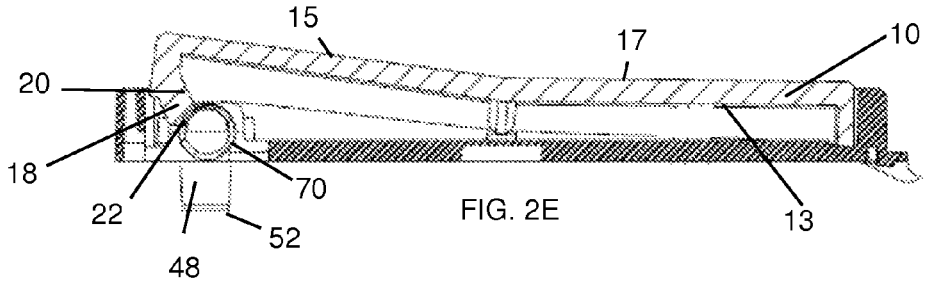

FIG. 2E

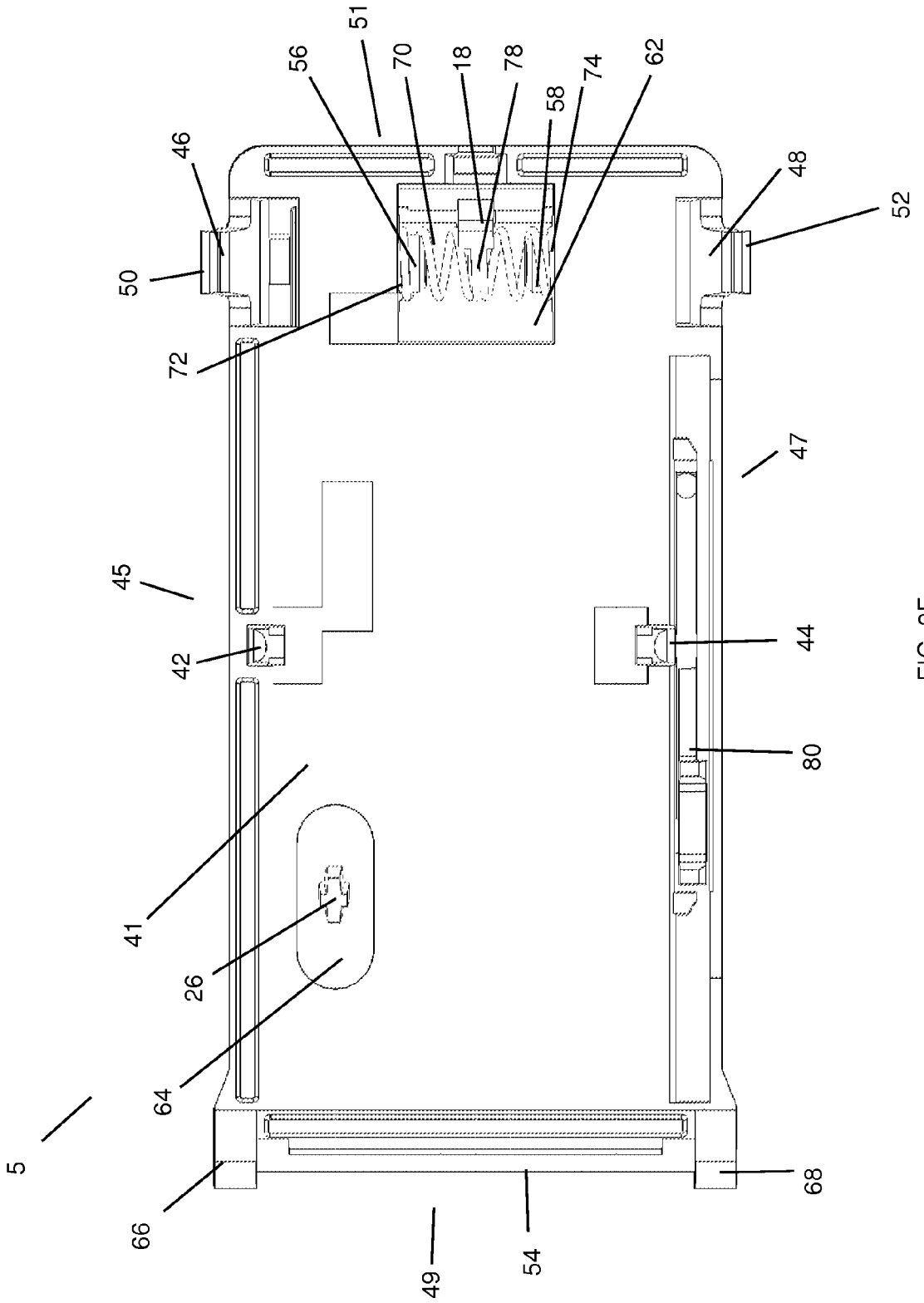
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FIG. 2F

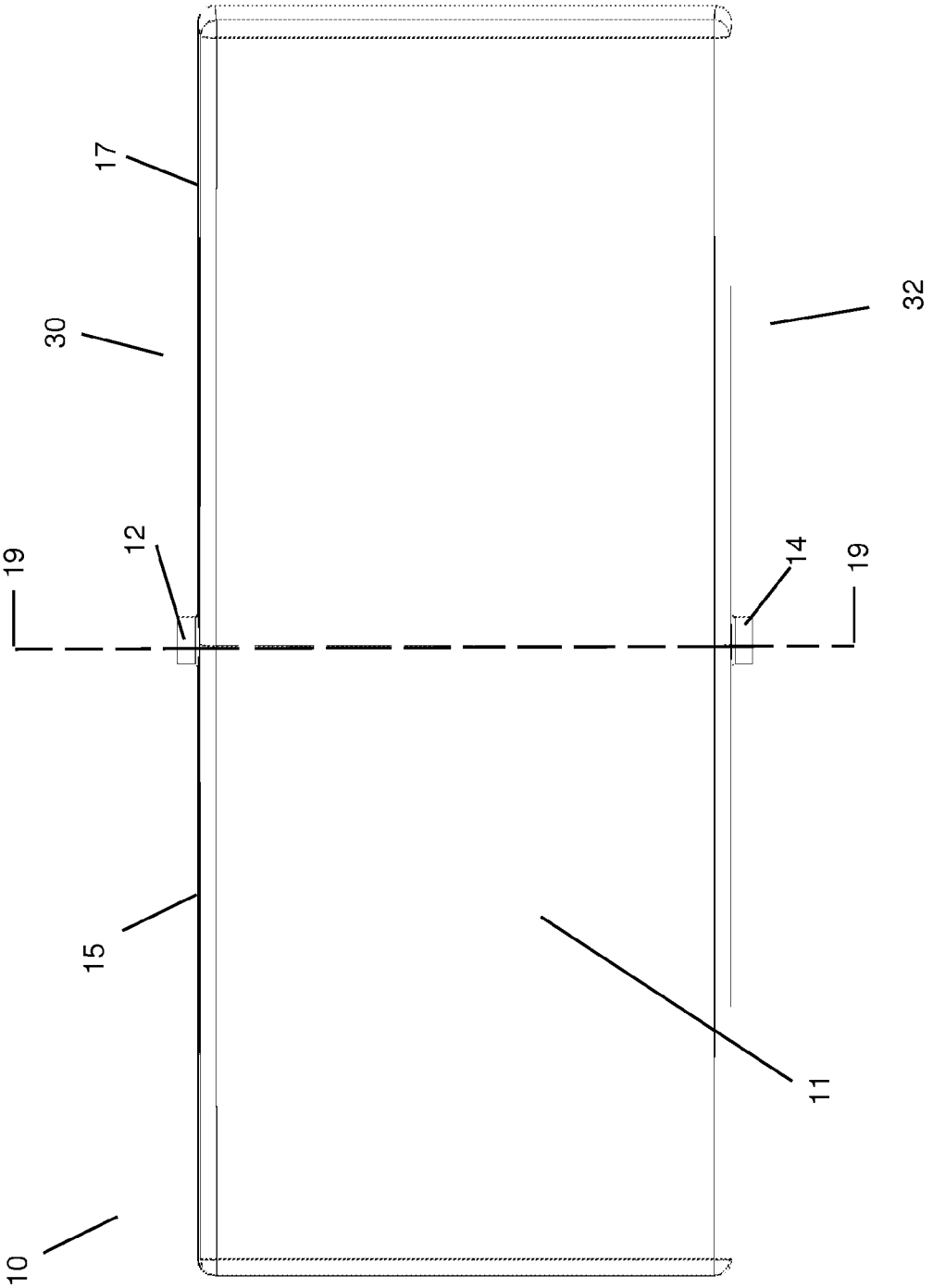

FIG. 3A

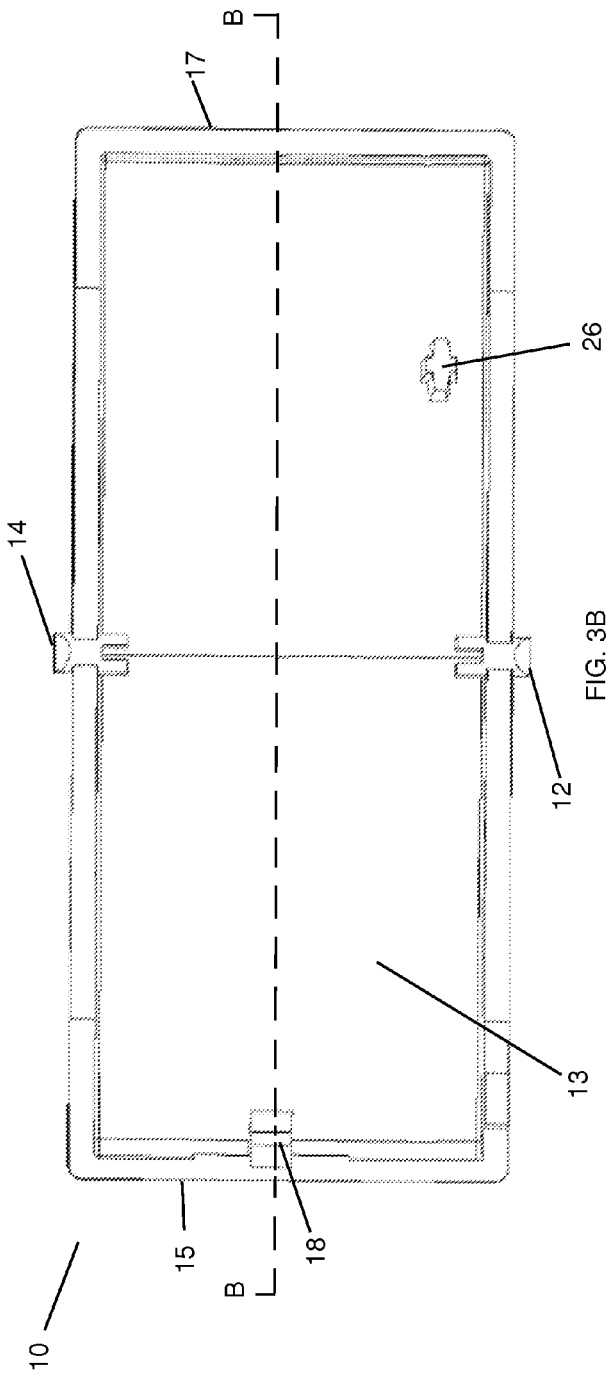

FIG. 3B

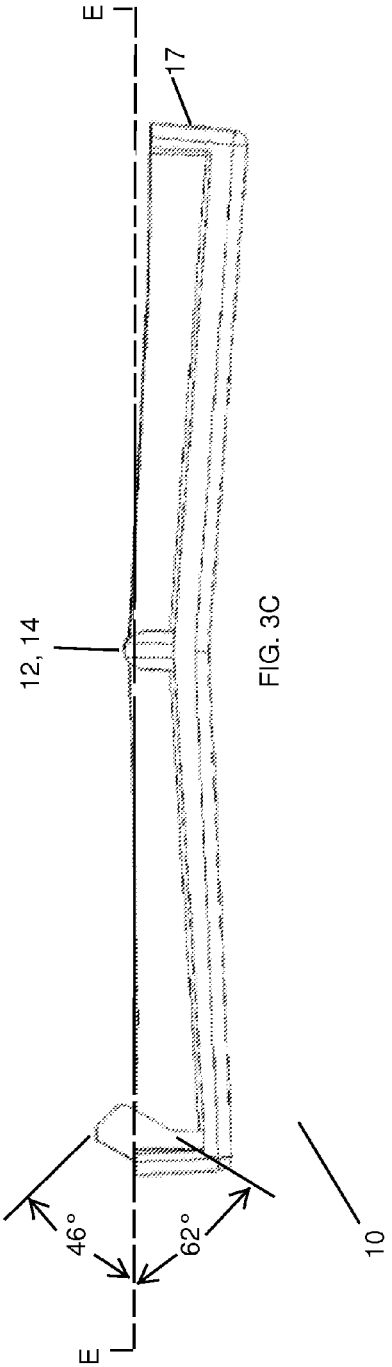

FIG. 3C

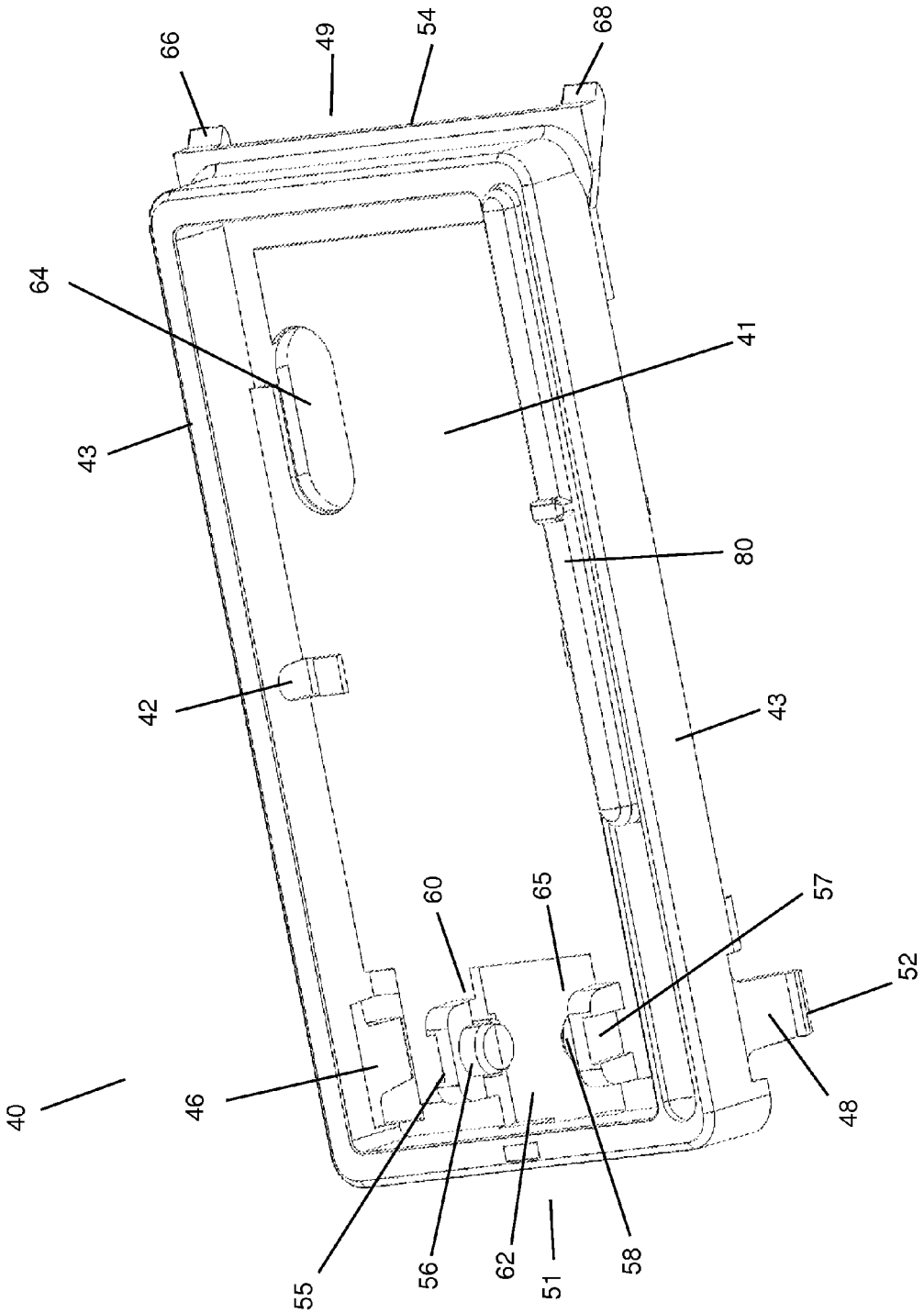

FIG. 4A

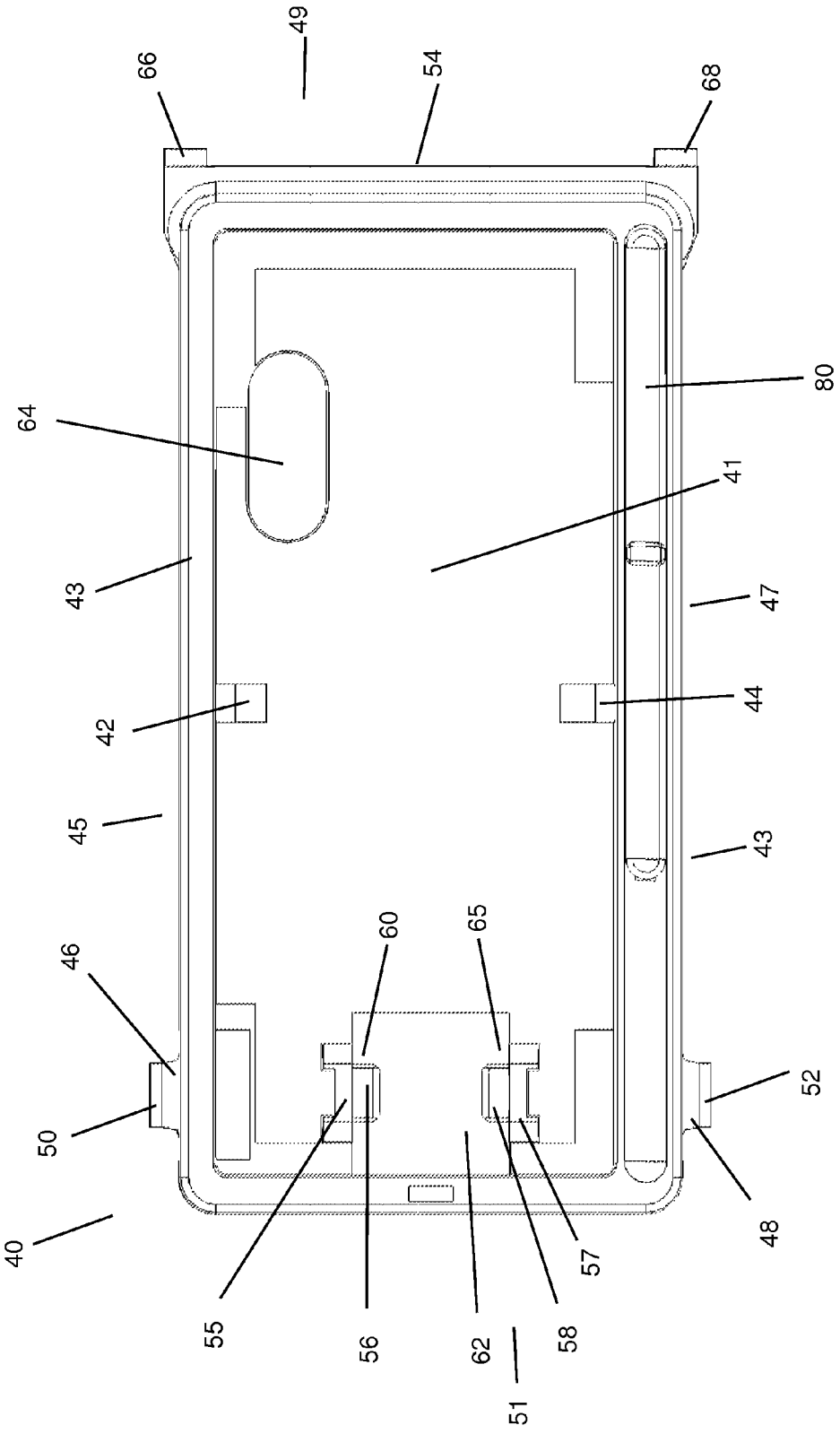
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FIG. 4B

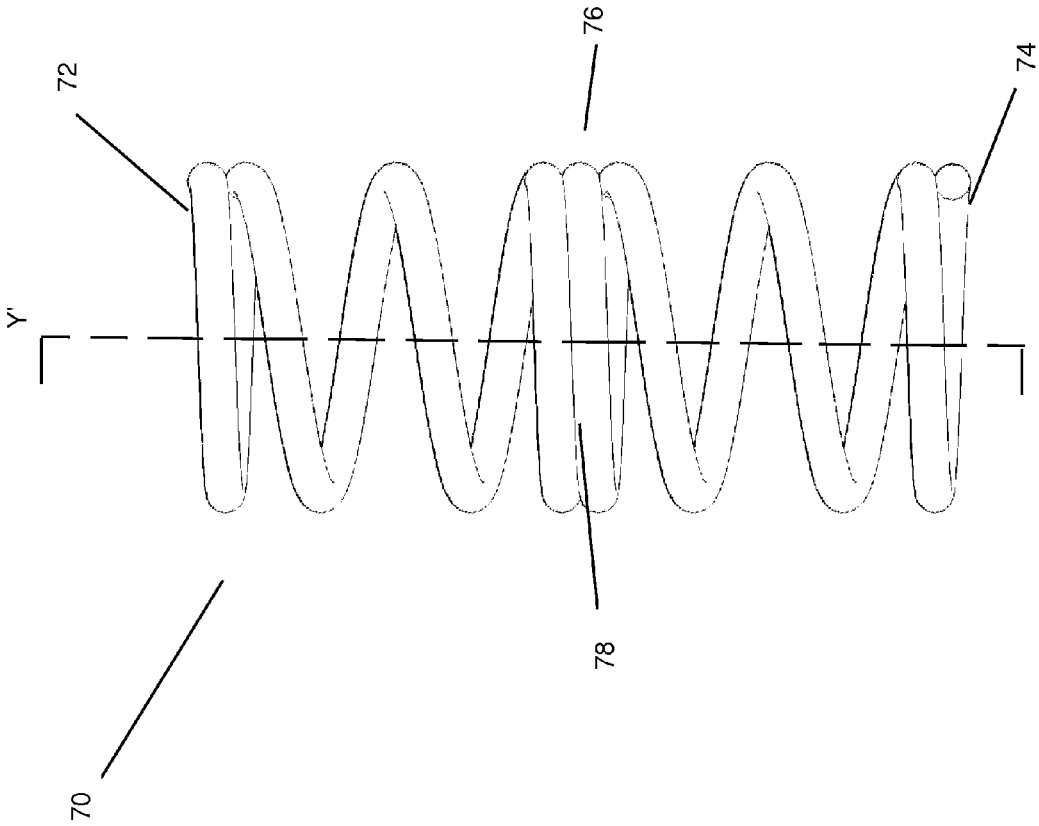

FIG. 5

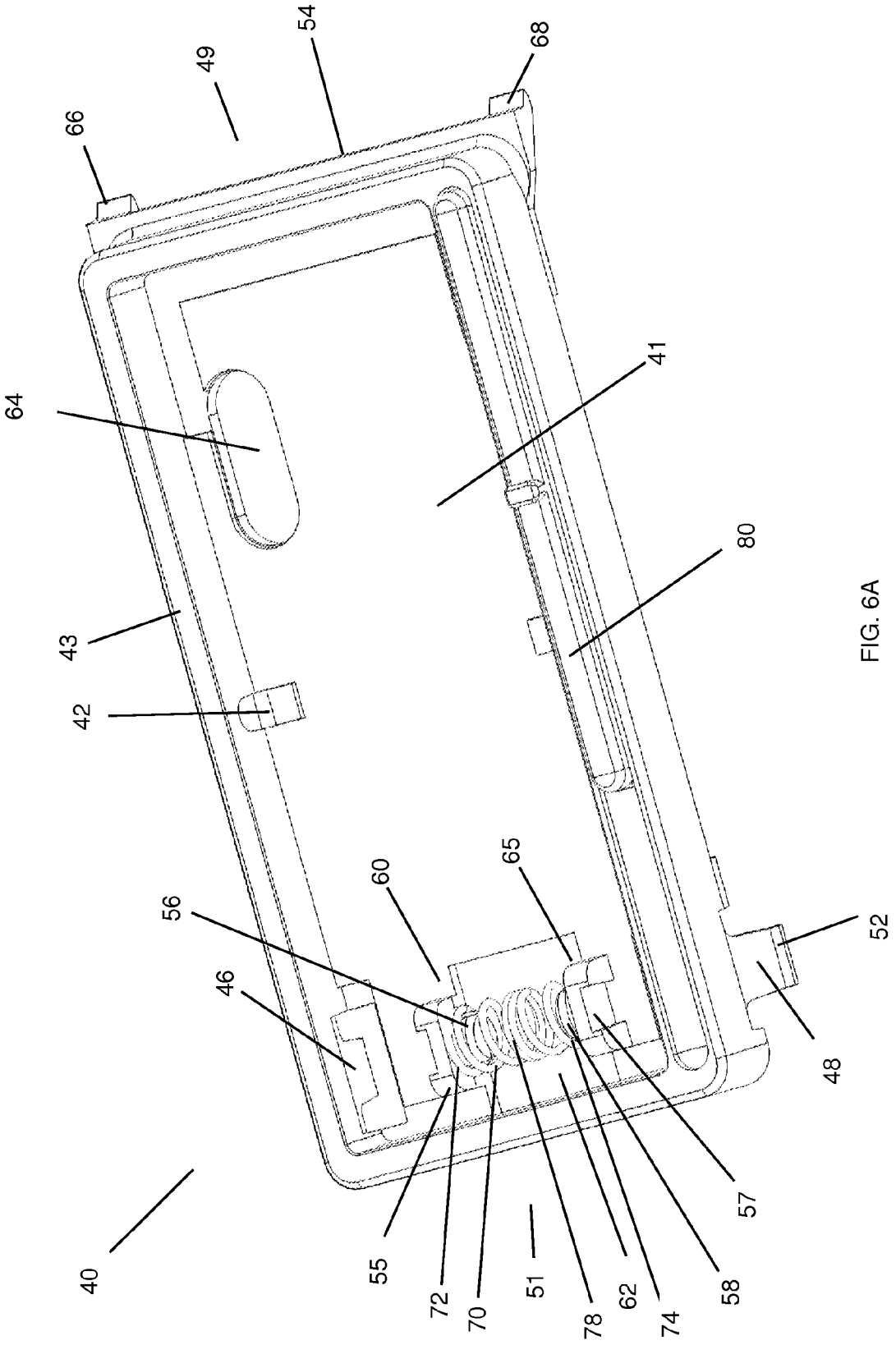
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FIG. 6A

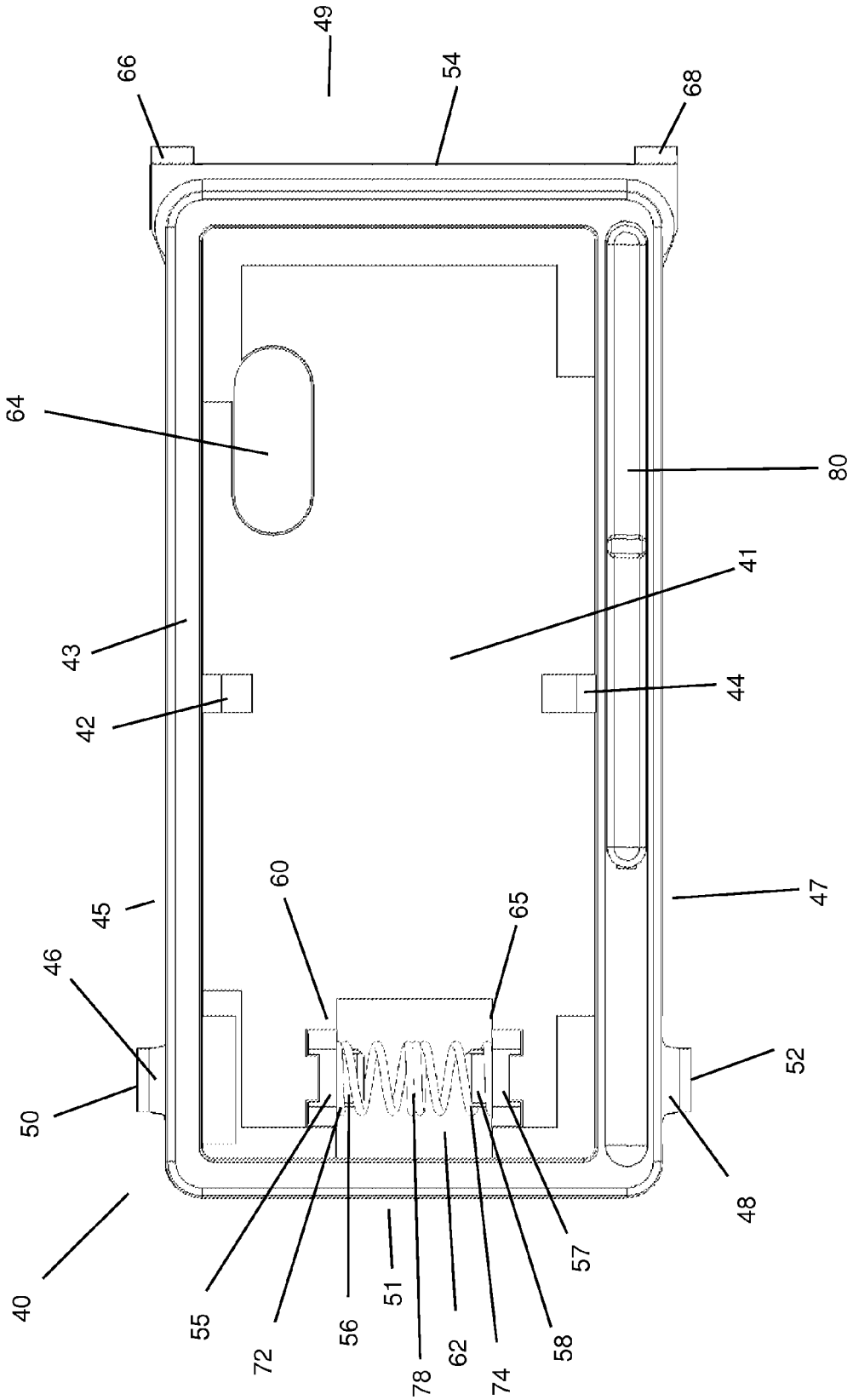
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FIG. 6B

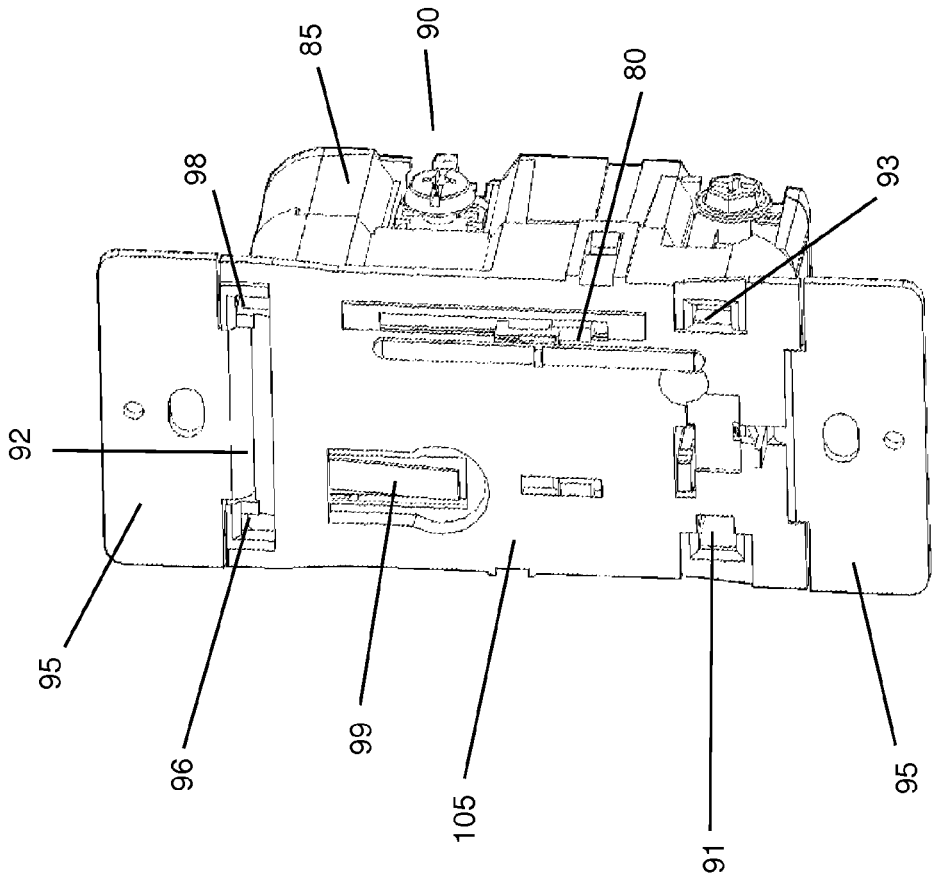


FIG. 7

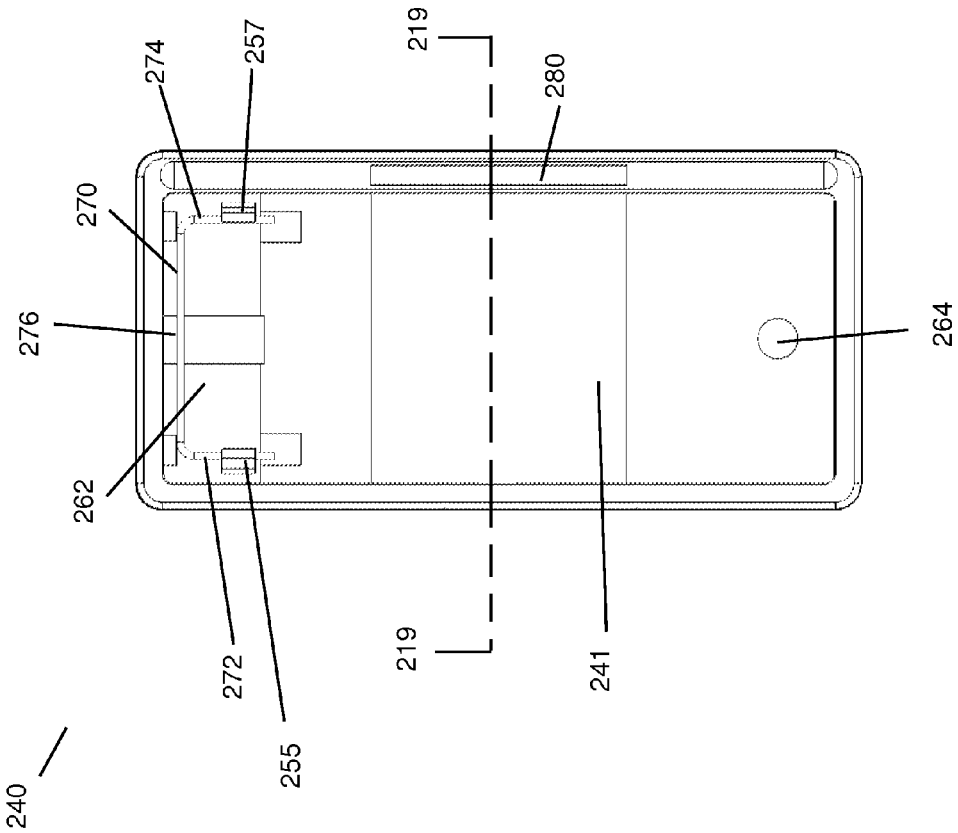
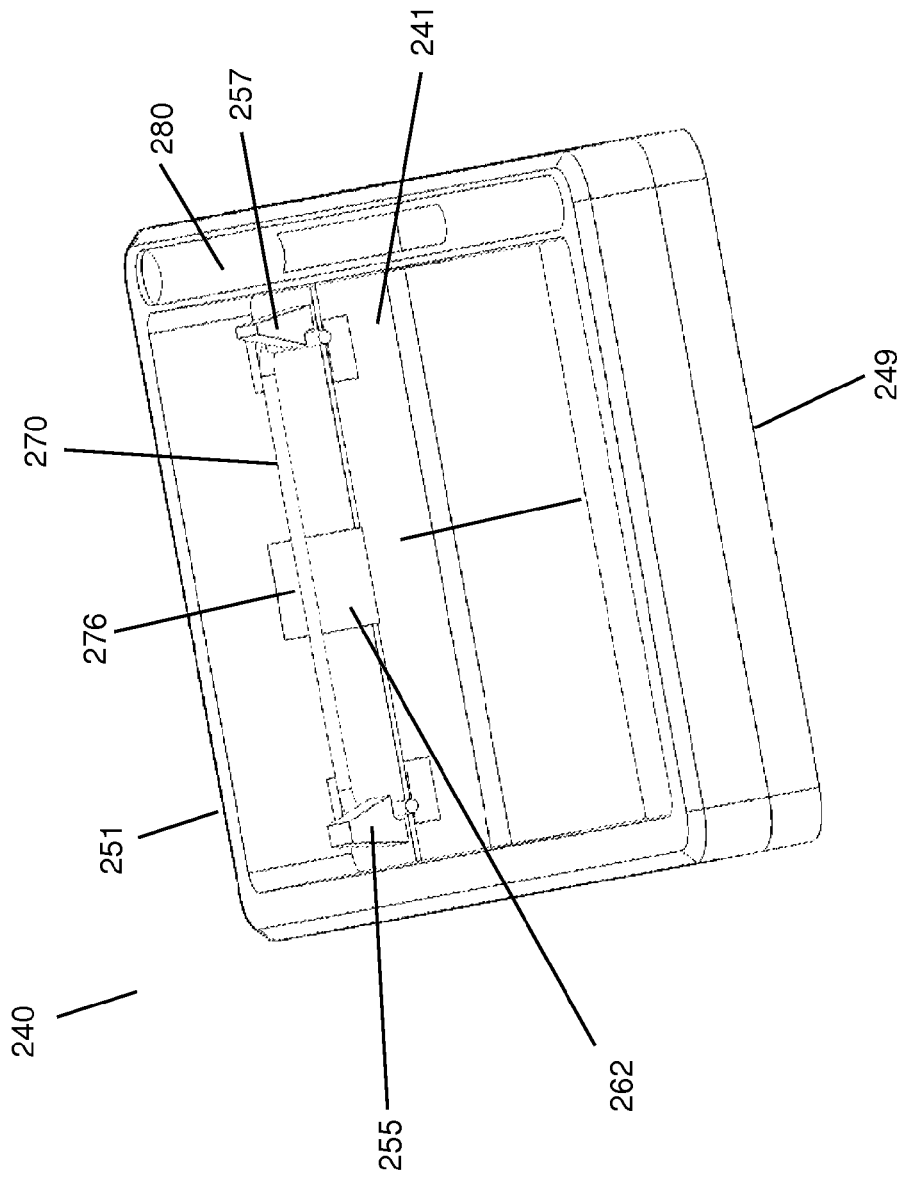


FIG. 8A



FIB. 8B

ACTUATOR BIASED BY A HORIZONTAL MEMBER

FIELD OF THE DISCLOSURE

The present disclosure relates generally to an electrical wiring device and, more particularly, relates to a switch actuator assembly for activating a switch in an electrical wiring device.

DESCRIPTION OF THE RELATED ART

Electrical wiring devices, such as switches, dimmer switches, etc., typically include a spring mechanism to actuate the switching component. When a user pushes an actuator on a wiring device, the spring mechanism is typically configured so that the spring mechanism is displaced along its longitudinal axis. However, this type of design has disadvantages because there is limited space in a wiring device, and a spring mechanism configured to be displaced along its longitudinal axis takes up valuable space and requires substantial depth in the wiring device to accommodate the movement of the spring mechanism. In addition, a design with the spring mechanism displaced along its longitudinal axis typically requires other components to be included in the wiring device, such as a lever mechanism, which takes up additional space and increases manufacturing costs. These types of designs are particularly disadvantageous in interchangeable color change kits that typically include the mechanism components in the rocker-frame assembly, which is separate from the rest of the electrical device.

It would be desirable for a wiring device to have an actuator biased by a component that is not displaced along its longitudinal axis. This would allow for the overall depth of the wiring device to decrease without compromising the balanced "feel" by the user when pressing the actuator. In addition, the number of unique parts required for manufacturing wiring devices would decrease, which would also reduce manufacturing complexity and costs, including inventory costs, labor costs, molding costs, etc.

SUMMARY OF THE DISCLOSURE

A switch actuator assembly for activating a switch in an electrical wiring device is disclosed. The switch actuator assembly preferably includes a frame having a peripheral wall, a rocker, first and second resilient member supports, a tab having a contact surface, and a resilient member. The first and second resilient member supports may extend from opposite sides of either the frame or the rocker, and the tab may extend from the other of the frame or the rocker. The first and second resilient member supports are preferably arranged and configured to be in registered alignment with respect to one another to form an axis. The resilient member preferably includes a first end, a second end, and a middle portion. A longitudinal axis of the resilient member may be defined between the first and second ends. The first and second ends are preferably configured to engage the first and second resilient member supports respectively, and the middle portion is preferably configured to interact with the tab. In use, the rocker is preferably pivotally mounted to the frame and configured to rotate between a first position and a second position. The contact surface of the tab preferably deflects the resilient member in a direction that is perpendicular to the longitudinal axis of the resilient member when the rocker is in the first position and the second position.

In a second, alternate embodiment of a switch actuator assembly for activating a switch in an electrical wiring device, the switch actuator assembly preferably includes a frame, a rocker, and a resilient member. The frame preferably includes first and second frame mounting members, a bottom wall, and first and second trunnions. The first and second frame mounting members preferably extend from the bottom wall, and the first and second trunnions are parallel to the bottom wall and project inwardly. The rocker preferably includes a bottom surface, a tab, and first and second sides. The tab preferably includes first and second surfaces, and the tab preferably extends from the bottom surface of the rocker. The first and second sides of the rocker preferably include first and second rocker mounting members respectively. The first and second rocker mounting members are preferably arranged and configured to pivotally mount to the first and second frame mounting members respectively. The resilient member preferably includes first and second ends and a bearing surface. A longitudinal axis of the resilient member may be defined between the first and second ends. The first and second ends are preferably configured to engage the first and second trunnions respectively, and the bearing surface is preferably arranged and configured to interact with the tab of the rocker. In use, the rocker is preferably adapted and configured to pivotally rotate between a first position and a second position. The first surface of the tab preferably deflects the bearing surface of the resilient member when the rocker is in the first position, and the second surface of the tab preferably deflects the bearing surface of the resilient member when the rocker is in the second position.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S)

One or more aspects of the present invention are particularly pointed out and distinctly claimed as examples in the claims at the conclusion of the specification. The foregoing and other objects, features, and advantages of the present invention may be more readily understood by one skilled in the art with reference being had to the following detailed description of several embodiments thereof, taken in conjunction with the accompanying drawings wherein like elements are designated by identical reference numerals throughout the several views, and in which:

FIG. **1** is a perspective view of an exemplary embodiment of an electrical wiring device;

FIG. **2**A is a perspective view of an exemplary embodiment of a rocker-frame assembly and a slide switch;

FIG. **2**B is an exploded view of the rocker-frame assembly and the slide switch of FIG. **2**A;

FIG. **2**C is a front view of the rocker-frame assembly and the slide switch of FIG. **2**A;

FIG. **2**D is a sectional view of the rocker-frame assembly of FIG. **2**C in a first position taken along section line A-A;

FIG. **2**E is a sectional view of the rocker-frame assembly of FIG. **2**C in a second position taken along section line A-A;

FIG. **2**F is a bottom view of the rocker-frame assembly and the slide switch of FIG. **2**A;

FIG. **3**A is a front view of a rocker of the rocker-frame assembly of FIG. **2**A;

FIG. **3**B is a bottom view of the rocker of FIG. **3**A;

FIG. **3**C is a sectional view of the rocker of FIG. **3**B taken along section line B-B;

FIG. **4**A is perspective view of a frame of the rocker-frame assembly and the slide switch of FIG. **2**A;

FIG. **4**B is a top view of the frame and the slide switch of FIG. **4**A;

FIG. **5** is a side view of a spring of the rocker-frame assembly of FIG. **2**A;

FIG. **6**A is a perspective view of the slide switch, a frame and a spring of the rocker-frame assembly of FIG. **2**A;

FIG. **6**B is a top view of the slide switch, the frame and the spring of FIG. **6**A;

FIG. **7** is a perspective view of the electrical device of FIG. **1**, with the rocker-frame assembly removed;

FIG. **8**A is a top view of an exemplary embodiment of a frame and a wire of the rocker-frame assembly; and

FIG. **8**B is a perspective view of the frame and the wire of the rocker-frame assembly of FIG. **8**A.

DETAILED DESCRIPTION

The present disclosure describes an apparatus, assembly and method for an electrical wiring device having an actuator (e.g., a rocker) biased by a resilient member. Embodiments will be described below while referencing the accompanying figures. The accompanying figures are merely examples and are not intended to limit the scope of the present disclosure.

FIG. **1** illustrates an exemplary embodiment of an electrical wiring device **90**. As shown, the electrical wiring device **90** may include a rocker **10**, a base **85**, a frame **40**, and a yoke **95**. In addition, the electrical wiring device **90** may include a switch **99** and a front housing **105** (see FIG. **7**). The switch **99** is adapted and configured for turning power "on"/"off" to an electrical load. In some embodiments, the electrical wiring device **90** may also include an optional slide potentiometer or slide switch **80** for dimmer and motor load control applications. In use, the rocker **10** is movable through a range of travel, for example, from a first position (see FIG. **2**D) and a second position (see FIG. **2**E). The first position of the rocker **10** corresponds to the "off" position of the electrical wiring device **90**; while the second position of the rocker **10** corresponds to the "on" position of the electrical wiring device **90**. As will be described in more detail below, when the rocker **10** is in the second position, the rocker **10** is pressing down on the switch **99**, thereby actuating the switch **99** and turning the power "on"; and, when the rocker **10** is in the first position, the rocker is not pressing down on or actuating the switch, and thus the power is "off." However, it will be understood by one of ordinary skill in the art that in other embodiments, such as embodiments that include a three-way switch, the "on" and "off" status with respect to the rocker position may change.

According to one aspect of the present invention, the electrical wiring device **90** preferably includes a resilient member to impart a force on the rocker **10**, biasing the rocker **10** through a range of travel, for example, from the first position and the second position. More preferably, the resilient member extends horizontally across the electrical wiring device **90** (e.g., along a minor axis of the rocker **10**). The resilient member may be any resilient member or material that can apply a biasing force now or hereafter known in the art including a spring, a wire (as shown in FIG. **8**A), a rubber piece, a plastic piece, and the like. Preferably, as best shown in FIG. **2**A, the resilient member is a coil spring.

As will be described in greater detail below, the rocker **10**, the frame **40**, the resilient member, and the optional slide potentiometer or slide switch **80** for dimmer and motor load control applications may be incorporated into a rocker-frame assembly **5** so that the rocker-frame assembly **5** is removable from the base **85**. In this manner, the rocker-frame assembly **5** may be provided as an interchangeable color changing kit that enables an installer or end user to easily change the color of the visible portions of the device **90** to coordinate with changes in the building décor or occupant preferences. Alternatively, as will be appreciated by one of ordinary skill in the art, the rocker **10** may be permanently coupled to the base **85**.

Referring to FIGS. **2**A-**2**F, an exemplary embodiment of the rocker-frame assembly **5** will now be described. As previously mentioned, the rocker-frame assembly **5** may include a rocker **10**, a frame **40**, and a resilient member, such as the spring **70**. In some embodiments, the rocker-frame assembly **5** may also include an optional slide potentiometer or slide switch **80** for dimmer and motor load control applications. As will be described in further detail below, the rocker-frame assembly **5** uses the buckling resistance of the spring **70** to impart a force on the rocker **10**, biasing the rocker **10** in a first position and a second position. The first position of the rocker-frame assembly **5** corresponds to the "off" position of the switch **99**; and, the second position of the rocker-frame assembly **5** corresponds to the "on" position of the switch **99**.

As shown in FIGS. **2**A-**2**F and **3**A-**3**C, the rocker **10** may include a first end **15**, a second end **17**, a top surface **11**, and a bottom surface **13**. The rocker **10** may also include a tab **18** and an arm **26**. The tab **18** and the arm **26** may extend from the bottom surface **13** of the rocker **10**. More specifically, the tab **18** may extend from the bottom surface **13** of the first end **15** of the rocker **10**, and the arm **26** may extend from the bottom surface **13** of the second end **17** of the rocker **10**. However, in other embodiments, the tab may extend from the bottom surface of the second end of the rocker, and the arm may extend from the bottom surface of the first end of the rocker.

The tab **18** may include a contact surface **21** having a first surface **20** and a second surface **22**. As will be described in greater detail below, the first and second surfaces **20**, **22** are preferably angled relative to a planar surface E-E, which is substantially parallel to a longitudinal axis Y' of the resilient member or spring **70** (see FIGS. **3**C and **5**-**6**B). In one exemplary embodiment, the angle of the first surface **20** is preferably 62 degrees, and the angle of the second surface **22** is preferably 46 degrees. However, it will be understood by one of ordinary skill in the art that these quantified angles are merely examples, and the first surface **20** and/or the second surface **22** may be of a different angle with respect to the planar surface E-E.

In addition, the rocker **10** may include first and second pins **12**, **14**. The first and second pins **12**, **14** may project from opposite sides **30**, **32** of the rocker **10**, and define a pivot axis **19**. The top surface **11** of the rocker **10** is configured to be pressed by a user to change the position of the rocker **10**. As shown, the top surface **11** is positioned at an inward angle towards the pivot axis. However, in other embodiments, any other suitable shape, contour, dimensions, angles, surfaces, etc. may be used for functional and/or aesthetic reasons.

As shown in FIGS. **2**A-F and **4**A-B, the frame **40** may include a bottom wall **41** and a peripheral wall **43** extending around the frame **40**. The frame **40** may also include first and second slots **42**, **44** positioned on opposite sides **45**, **47** of the frame **40**, and adapted and configured to receive the first and second pins **12**, **14** of the rocker **10**.

The frame **40** may also include first and second openings **62**, **64** that are formed in the bottom wall **41**. As will be described in more detail below, the first opening **62** is

adapted and configured to be in registered alignment with and accommodate the tab **18** of the rocker **10** to allow the tab **18** to extend at least partially through the first opening **62** when the rocker **10** is in the first position; and, the second opening **64** is adapted and configured to be in registered alignment with and accommodate the arm **26** of the rocker **10** and the switch **99** of the electrical device **90** (see FIG. **7**).

The frame **40** preferably includes first and second resilient member supports **60**, **65**. The first and second resilient member supports **60**, **65** may be arranged and configured to be in registered alignment with respect to one another to form an axis. In the embodiment of FIG. **4**A-B, the first and second resilient member supports **60**, **65** may include first and second support members **55**, **57** and first and second trunnions **56**, **58**, respectively. The support members **55**, **57** may extend from the bottom wall **41**, and the first and second trunnions **56**, **58** may extend from oppositely-facing inner surfaces of the first and second support members **55**, **57**, respectively. In use, the resilient member supports **60**, **65** are positioned on opposite sides of the first opening **62** of the frame **40**, and may be fixed. As will be described in more detail below, the first and second resilient member supports **60**, **65** are each adapted and configured to receive an end **72**, **74** of the spring **70** (see FIG. **6**A-B). It will be understood by one of ordinary skill in the art that the resilient member supports may be any feature or component that is configured to support the resilient member. For example, in other embodiments, the resilient member supports may extend from the peripheral wall or sides of the frame. In other alternate embodiments, the resilient member supports may extend from the rocker.

The frame **40** may also include a hinge **54** extending from the bottom wall **41** thereof and positioned at one end **49** of the frame **40**. The hinge **54** may include first and second feet **66**, **68** that are positioned on opposite sides **45**, **47** of the frame **40**, respectively. Furthermore, the frame **40** may include first and second snaps **46**, **48** extending from the bottom wall **41** and/or the peripheral wall **43**, on opposite sides **45**, **47** of the frame **40**, respectively. The first and second snaps **46**, **48** may each include a latch portion **50**, **52**, respectively. As will be described in more detail below, the hinge **54**, feet **66**, **68** and snaps **46**, **48** are adapted and configured to engage with the front housing **105** of the electrical wiring device **90** to secure the rocker-frame assembly **5** to the electrical wiring device **90** (see FIGS. **1** and **7**).

As shown in FIGS. **5** and **6**A-B, the spring **70** may include a first end **72**, a second end **74**, and a middle portion **76**. The spring **70** may have a longitudinal axis Y' defined between the first and second ends **72**, **74**. The first end **72** of the spring **70** may be adapted and configured to be positioned around the first trunnion **56**, and the second end **74** of the spring **70** may be adapted and configured to be positioned around the second trunnion **58**. When the spring **70** is engaged with the first and second trunnions **56**, **58**, the first and second ends **72**, **74** of the spring **70** are fixed against translation along an axis that is perpendicular to the longitudinal axis Y' of the spring **70**, and positioned horizontally in the frame **40** so that it is substantially parallel to the pivot axis **19**. In a preferred embodiment, the middle portion **76** may include a bearing surface **78**, in which at least a portion of the spring coils are in a close or contacting relationship. Preferably, at least two adjacent, successive coils are in a close or contacting relationship. As will be described in more detail below, the bearing surface **78** is adapted and configured to engage the tab **18** of the rocker **10**. The spring **70** may be any spring now or hereafter known in the art including a coil spring, a compression spring, and the like.

To assemble the rocker-frame assembly **5**, the first and second ends **72**, **74** of the spring **70** are coupled to the first and second trunnions **56**, **58**, respectively. Furthermore, the first and second pins **12**, **14** of the rocker are received by the first and second slots **42**, **44** of the frame **40**, respectively, thereby enabling the rocker **10** to pivot within the frame **40** about the pivot axis **19**. In other embodiments, the rocker may include first and second rocker mounting members that extend from the first and second sides of the rocker, respectively; and, the frame may include first and second frame mounting members that extend from the bottom wall and/or the peripheral wall. The first and second rocker mounting members may be arranged and configured to pivotally mount to the first and second frame mounting members respectively. The first and second rocker mounting members may include first and second pins respectively, the first and second pins defining a pivot axis. In addition, the first and second frame mounting members may include first and second slots respectively, the first and second slots arranged and configured to receive the first and second pins.

In use, the rocker **10** may pivotally rotate about the pivot axis **19** through a range of travel, for example, from a first position (see FIG. **2**D) to a second position (see FIG. **2**E). When the rocker **10** is in the first position, the switch **99** (see FIG. **7**) is "off." More specifically, in the first position or "off", the arm **26** of the rocker **10** is in registered alignment with the switch **99** and the opening **64** of the frame **40**, but the arm **26** is not pressing down on the switch **99**. When the rocker **10** is in the second position, the switch **99** is "on." More specifically, in the second position or "on", the arm **26** of the rocker **10** is in registered alignment with the switch **99** and the opening **64** of the frame **40**, and the arm **26** is pressing down on the switch **99** to thereby actuate the switch **99**.

As shown in FIGS. **2**D-E, when the rocker **10** is rotated about the pivot axis **19**, the contact surface **21** of the tab **18** rides against the bearing surface **78** of the spring **70**. More specifically, when the rocker **10** is in the first position (i.e. a user presses the first end **15** of the rocker **10**), the first surface **20** of the tab **18** is in contact with the bearing surface **78** of the spring **70**; and, the tab **18** displaces the spring **70** forward towards the direction of the pivot axis **19** and upward towards the direction of the bottom surface **13** of the rocker **10**. Thus, the spring **70** is deflected perpendicular to its longitudinal axis Y' towards the direction of the pivot axis **19** when the rocker **10** is in the first position. When the rocker **10** is in the second position (i.e. a user presses the second end **17** of the rocker **10**), the second surface **22** of the tab **18** is in contact with the bearing surface **78** of the spring **70**; and, the tab **18** displaces the spring **70** forward towards the direction of the pivot axis **19** and downward towards the direction of the opening **62** of the frame **40**. Thus, the spring **70** is deflected perpendicular to its longitudinal axis Y' downward towards the direction of the opening **62** when the rocker **10** is in the second position.

In both the first and second positions, the tab **18** applies force on the spring **70**, displacing or bending the spring **70** so that the spring **70** follows the path of an arc; and, the buckling resistance of the spring **70** imparts a force on the rocker **10**. That is, the spring **70** provides a biasing force to keep the rocker **10** in the first or second position until a user applies pressure to an end **15**, **17** of the rocker **10**, causing the rocker **10** to pivot about the pivot axis **19** to the other respective first or second position.

As shown in FIGS. **3**A-C, the angle of the first surface **20** of the tab **18** is preferably 62 degrees relative to planar surface E-E, and the angle of the second surface **22** of the tab **18** is preferably 46 degrees relative to planar surface E-E. These examples of quantified angles of the first and second surfaces **20**, **22** provide a balance so that the rocker **10** may be switched from the first position to the second position (and vice versa), with the user applying the same amount of force for each position. However, it will be understood by one of ordinary skill in the art that these quantified angles above are merely examples, and the first surface **20** and/or the second surface **22** may be of a different angle with respect to the planar surface E-E, as long as the angles are not perpendicular to the plane E-E. It will also be understood by one of ordinary skill in the art that the angles of the first and second surfaces may be dependent on the geometry of the tab.

In the exemplary embodiment described above, the tab **18** extends from the rocker **10**, and the frame **40** is adapted and configured to engage with the spring **70** via the first and second support members **55**, **57** and the first and second trunnions **56**, **58**. However, it will be understood by one of ordinary skill in the art that in other embodiments, the tab may extend from the frame; and, the first and second resilient member supports, and/or any other attachment feature or component that is adapted and configured to receive an end of the spring, may extend from the rocker. For example, the first and second resilient member supports may extend from the bottom surface of the rocker, the first and second sides of the rocker, etc.

The frame **40** may be attached to the electrical wiring device **90** in any convenient manner. As previously mentioned, in the exemplary embodiment shown in FIGS. **2**A-F, **4**A-B, **6**A-B, and **7**, the hinge **54** may be aligned with an opening **92** formed in the front housing **105**, and the feet **66**, **68** of the hinge **54** may be positioned within respective openings **96**, **98** formed in the front housing **105** (see FIG. **7**). The rocker-frame assembly **5** may be pivoted to the installed position. The first and second snaps **46**, **48** of the frame **40** may pass through openings **91**, **93** of the front housing **105** so that the latch portions **50**, **52** snap into the respective openings **91**, **93**.

In the exemplary embodiment described above, the spring **70** is positioned horizontally between the rocker **10** and the frame **40**, wherein the first and second ends **72**, **74** of the spring **70** are held in place by the first and second trunnions **56**, **58** respectively so that the spring **70** may not be displaced along its longitudinal axis Y', and the first and second ends **72**, **74** are prevented from translating toward or away from the bottom surface **13** of the rocker **10**. Thus, the overall depth of the rocker-frame assembly **5** may be minimized because extra space is not needed for the spring **70** to be displaced along its longitudinal axis and/or for the first and second ends **72**, **74** of the spring **70** to translate. A decrease in overall depth of the rocker-frame assembly **5** may be ideal for applications, such as but not limited to, interchangeable color change kits that enable an installer or end user to easily change the color of the visible portions of the device to coordinate with changes in the building decor or occupant preferences.

In addition, in the exemplary embodiment described above, a slide potentiometer or slide switch **80** is positioned in the frame **40** adjacent the rocker **10**. However, it will be understood by one of ordinary skill in the art that in other embodiments, the electrical wiring device may not include a slide potentiometer or slide switch, or may include a slide potentiometer or slide switch but of a different shape, size, etc. Furthermore, in other embodiments, the slide potentiometer or slide switch may be in a different position or configuration on the device, such as but not limited to, being positioned within the rocker. Furthermore, in other embodiments, the incorporation of a horizontally aligned spring according to the description herein may be employed in switching of a dimmer or any other electrical wiring device.

A method for assembling an electrical device **90** will now be described. The spring **70** is positioned on the frame **40** as described in detail above. The first end **72** of the spring **70** may pass over the first trunnion **56** of the frame **40**, and the second end **74** of the spring **70** may pass over the second trunnion **58** of the frame **40**. The rocker **10** may be pivotally attached or mounted to the frame **40** to enable the tab **18** on the rocker **10** to deflect the spring **70** perpendicular to a longitudinal axis of the spring **70** when the rocker **10** is in a first position and a second position. The first and second slots **42**, **44** on the frame **40** are adapted and configured to receive the first and second pins **12**, **14** on the rocker **10**.

To attach the rocker-frame assembly **5** to the front housing **105**, the user aligns a hinge **54** on the frame **40** with the opening **92** on the front housing **105**, and inserts the first and second feet **66**, **68** and the hinge **54** on the frame **40** into the openings **92**, **96**, **98** on the front housing **105**, respectively. The user may then pivot the rocker-frame assembly **5** into the installed position by inserting the first and second snaps **46**, **48** of the frame **40** into the openings **91**, **93** on the front housing **105** that are adapted and configured to be aligned with the snaps **46**, **48** until the latches **50**, **52** on the snaps **46**, **48** engage the openings **91**, **93** to hold the rocker-frame assembly **5** in the installed position.

Referring to FIG. **8**A-B, in another exemplary embodiment, the resilient member of the electrical wiring device may be a wire **270**. The wire **270** may include a first end **272**, a second end **274**, and a middle portion **276**. The first end **272** is adapted and configured to be positioned between a bottom wall **241** of the frame **240** and a first support member **255** that extends from the bottom wall **241**. The second end **274** of the wire **270** is adapted and configured to be positioned between the bottom wall **241** of the frame **240** and a second support member **257** that extends from the bottom wall **241**. The wire **270** is positioned in the frame **240** so that the wire **270** is stationary, and the middle portion **276** is substantially parallel to the pivot axis **219**.

While certain embodiments of the disclosure have been described herein, it is not intended that the disclosure be limited thereto, as it is intended that the disclosure be as broad in scope as the art will allow and that the specification be read likewise. Therefore, the above description should not be construed as limiting, but merely as exemplifications of particular embodiments. Those skilled in the art will envision additional modifications, features, and advantages within the scope and spirit of the claims appended hereto.

What is claimed is:

1. A switch actuator assembly for activating a switch in an electrical wiring device comprising:

a. a frame including a peripheral wall;

b. a rocker pivotally mounted to the frame and configured to rotate between a first position and a second position;

c. first and second resilient member supports extending from opposite sides of one of the frame or the rocker, the first and second resilient member supports arranged and configured to be in registered alignment with respect to one another to form an axis;

d. a tab including a contact surface, the tab extending from the other of the frame or the rocker;

e. a resilient member including a first end, a second end, and a middle portion, the resilient member having a longitudinal axis defined between the first and second ends, the first and second ends being configured to engage the first and second resilient member supports, respectively, and the middle portion being configured to interact with the tab,

wherein the contact surface of the tab deflects the resilient member in a direction that is perpendicular to the longitudinal axis of the resilient member when the rocker is in the first position and the second position.

2. The switch actuator assembly of claim **1**, wherein the rocker includes first and second pins defining a pivot axis, and the frame includes first and second slots to receive the first and second pins.

3. The switch actuator assembly of claim **1**, wherein the resilient member is a coil spring.

4. The switch actuator assembly of claim **1**, wherein the resilient member is a wire.

5. The switch actuator assembly of claim **3**, wherein the middle portion includes a bearing surface having a plurality of coils in a contacting relationship.

6. The switch actuator assembly of claim **1**, wherein the first and second ends of the resilient member are fixed against translation along an axis that is perpendicular to the longitudinal axis of the resilient member.

7. The switch actuator assembly of claim **1**, wherein the rocker includes a top surface and a bottom surface, the tab extending from the bottom surface of the rocker, and wherein the frame includes a bottom wall arranged between the peripheral wall, the bottom wall including a first opening formed therein and that is arranged and configured to be in registered alignment with the tab of the rocker to allow the tab to extend at least partially through the first opening when the rocker is in the first position.

8. The switch actuator assembly of claim **7**, wherein the first and second resilient member supports include first and second support members, respectively, the first and second support members extending from the bottom wall of the frame and positioned on opposite sides of the first opening formed in the bottom wall.

9. The switch actuator assembly of claim **8**, wherein the first and second resilient member supports further include first and second trunnions extending from the first and second support members, respectively.

10. The switch actuator assembly of claim **1**, wherein the frame, the rocker, and the resilient member comprise an interchangeable kit.

11. The switch actuator assembly of claim **1**, wherein the contact surface includes a first surface and a second surface, the first surface being arranged and configured to deflect the resilient member when the rocker is in the first position and the second surface being arranged and configured to deflect the resilient member when the rocker is in the second position.

12. The switch actuator assembly of claim **1**, wherein the first surface and the second surface of the tab are angled relative to a planar surface that is substantially parallel to the longitudinal axis of the resilient member.

13. The switch actuator assembly of claim **7**, wherein the rocker further includes a first end, a second end, and an arm, the tab extending from the bottom surface of the first end of the rocker, and the arm extending from the bottom surface of the second end of the rocker.

14. The switch actuator assembly of claim **13**, wherein the arm is arranged and configured to actuate the switch in the electrical wiring device when the rocker is in the second position.

15. The switch actuator assembly of claim **1**, wherein the frame includes first and second snaps and first and second feet configured to be removably attached to the electrical wiring device.

16. A switch actuator assembly for activating a switch in an electrical wiring device comprising:

a. a frame including first and second frame mounting members, a bottom wall, and first and second trunnions, the first and second frame mounting members extending from the bottom wall, and the first and second trunnions parallel to the bottom wall and projecting inwardly;

b. a rocker including a bottom surface, a tab extending from the bottom surface of the rocker and having first and second surfaces, and first and second sides having first and second rocker mounting members respectively, the first and second rocker mounting members arranged and configured to pivotally mount to the first and second frame mounting members respectively, wherein the rocker is adapted and configured to pivotally rotate between a first position and a second position:

c. a resilient member including first and second ends and a bearing surface, the resilient member having a longitudinal axis defined between the first and second ends, the first and second ends being configured to engage the first and second trunnions respectively, and the bearing surface being arranged and configured to interact with the tab of the rocker,

wherein the first surface of the tab deflects the bearing surface of the resilient member when the rocker is in the first position, and the second surface of the tab deflects the bearing surface of the resilient member when the rocker is in the second position.

17. The switch actuator assembly of claim **16**, wherein the resilient member is a coil spring.

18. The switch actuator assembly of claim **17**, wherein at least a portion of the bearing surface includes a plurality of coils in a contacting relationship.

19. The switch actuator assembly of claim **16**, wherein the first and second rocker mounting members include first and second pins respectively, the first and second pins defining a pivot axis, and wherein the first and second frame mounting members include first and second slots respectively, the first and second slots arranged and configured to receive the first and second pins.

20. The switch actuator assembly of claim **16**, wherein the first and second ends of the resilient member are fixed against translation along an axis that is perpendicular to the longitudinal axis of the resilient member.

21. The switch actuator assembly of claim **16**, wherein the bottom wall of the frame includes a first opening formed therein, the first opening arranged and configured to be in registered alignment with the tab of the rocker to allow the tab to extend at least partially through the first opening when the rocker is in the first position, and wherein the first and second trunnions are positioned on opposite sides of the first opening.

22. The switch actuator assembly of claim **21**, wherein the frame further includes first and second support members extending from the bottom wall of the frame and positioned

on opposite sides of the first opening, the first and second trunnions extending from the first and second support members respectively.

23. The switch actuator assembly of claim **16**, wherein the frame, the rocker, and the resilient member comprise an interchangeable kit.

24. The switch actuator assembly of claim **16**, wherein the first and second surfaces of the tab are angled relative to a planar surface that is substantially parallel to the longitudinal axis of the resilient member.

25. The switch actuator assembly of claim **16**, wherein the rocker further includes a first end, a second end, and an arm, the tab extending from the bottom surface of the first end of the rocker, and the arm extending from the bottom surface of the second end of the rocker.

26. The switch actuator assembly of claim **25**, wherein the arm is arranged and configured to actuate the switch in the electrical wiring device when the rocker is in the second position.

27. The switch actuator assembly of claim **16**, wherein the frame includes first and second snaps and first and second feet configured to be removably attached to the electrical wiring device.

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